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SERUM VITAMIN D LEVELS IN HEALTHY INDIVIDUALS

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ABSTRACT

Vitamins are known to be associated with immunity and nutrition. Moreover, vitamin deficiency can affect host immunity to various infectious diseases. We performed a study to investigate the serum vitamin D concentrations in 100 healthy individuals (62 males and 32 females) at Mullana, Ambala, Haryana and it was found that 55% healthy individuals were suffering from hypovitaminosis D. The mean serum vitamin D levels were 31.08 ng/ml. Out of 100 healthy control individual, 13 healthy individual were suffering from vitamin D deficiency (Vitamin D concentration = 10 to 20 ng/ml), 43 were suffering from vitamin D insufficiency (Vitamin D concentration = 20 to 30 ng/ml) and rest of 44 healthy individuals have sufficient vitamin D levels (vitamin D concentration > 30 ng/ml). The mean serum vitamin D levels in males and females were 31.49 and 30.41 ng/ml, respectively. In conclusion, vitamin D deficiency is common in healthy individuals at Mullana, Ambala, Haryana.

KEYWORDS: Vitamin D, Disease, Immunity, Hypovitaminosis.

INTRODUCTION:

Vitamin D

Vitamin D is a lipid soluble vitamin found in small amounts in few foods, including fatty fish. The active form of vitamin D is calcitriol (Fig. 1). Most of the vitamin D is obtained through exposure to sunlight. There are two forms of vitamin D- vitamin D_2 (ergocalciferol) which is of plant origin and vitamin D_3 (cholecalciferol) which is of animal origin. Vitami D_3 is synthesized in the skin from 7-dehydrocholesterol by ultraviolet irradiation.[1] Vitamin D is used for preventing and treating rickets, osteoporosis, bone pain (osteomalacia), bone loss in patients with hyperparathyroidism, and an inherited disease-osteogenesis imperfecta, in which the bones are especially brittle and easily broken. It is also used for boosting the immune system, and preventing autoimmune diseases and cancer.[2]

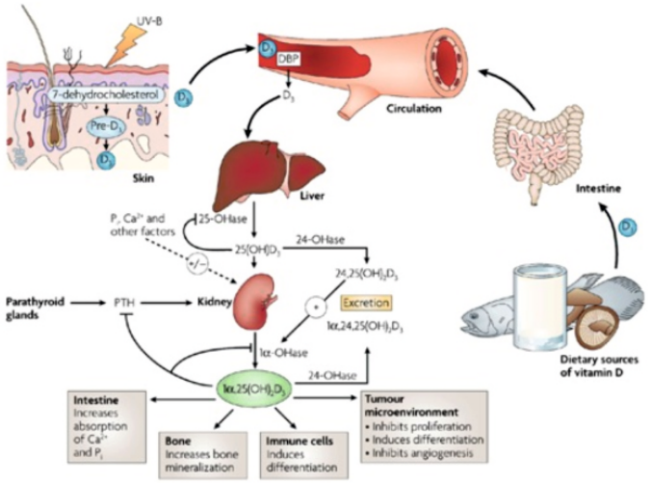

Figure 1: Activation of vitamin D.

In recent year vitamin D buzzword in disease prevention and treatment. There is an ever expanding list of communicable and non-communicable disease being associated with vitamin D deficiency, including type-1 and type-2 diabetes mellitus, rheumatoid arthritis, cardiovascular disease, osteoporosis, multiple sclerosis, depression, asthma, colorectal, lung and breast cancer, tuberculosis, HIV/AIDS progression and mortality. No longer is vitamin D considered solely a regulator of calcium and bone homeostasis; it is now recognized to have a diverse range of physiological functions including cellular differentiation, activation and death. One reason for its pleiotropic actins is the fact that vitamin differs from most other vitamins in that its primary active metabolite, 1,25 $(OH)_2D$ is a steroid hormone. Moreover, unlike many other vitamins which act an ontioxidants or enzyme cofactors, vitamin D metabolites are ligand for the vitamin D receptor and binding activates receptor-mediated signaling. Binding to the cell membrane receptor elicits rapid responses thrigh activating intracellular signaling pathways, while binding to the nuclear receptor forms and activated ligand dependent transcription factor complex that regulates the expression of more than 900 genes and microRNA.[3,4,5]

AIMS AND OBJECTIVES:

- To evaluate serum vitamin D levels in healthy individuals.

MATERIALS AND METHOD:

The study was conducted at Mullana, Ambala, Haryana. The study was conducted in 100 healthy subjects aged 15 years and above of either sex served.

Inclusion Criteria:

1. Age 15 years and above.
2. Either sex.

Exclusion Criteria:

1. Age <15 years.
2. Pregnancy and lactation.
3. Subjects on vitamin D and/or calcium supplements.
4. Drugs that affect bone metabolism, e.g. antiepileptic drugs.
5. Patients with known skeletal disease and parathyroid disorders.
6. Chronic kidney/liver disease.

Estimation of Serum Vitamin D [25(OH)D] Levels:

It was assayed by direct competitive chemiluminescence immunoassay (CLIA).[6] 3 ml of venous blood sample was aseptically collected as per the standard guidelines and protocol. Serum was allowed to separate and subsequently analyzed for serum vitamin D level.

- Reference range: 30 - 100 ng/ml
- Insufficiency: 20 – 30 ng/ml
- Deficiency: 10 -20 ng/ml

RESULT:

The present study was conducted to assess the serum vitamin D levels in in healthy individuals at Mullana, Ambala, Haryana. One hundred of healthy subjects aged 15 years and above of either sex include in the study.

Out of 100 healthy individuals, 62 were males and 38 were females. 55 healthy individuals (55%) were found to be suffering from hypovtaminosis D (Table 1). The mean vitamin D was found to be 31.08 ng/ml. The mean serum vitamin D concentration of males (31.49 ng/ml) was found to be slightly greater than female serum vitamin D concentration (30.41 ng/ml) (Table 2). It was also found that out of 100 healthy individuals, 13% was vitamin D deficiency and 43 % have vitamin insufficiency. Only 44% healthy individuals have normal vitamin D concentration.

Table 1: Distribution of participants according to their Vitamin D status

Sex	Hypovitamin D	Normal Vitamin D	Total
Male	32 (32%)	30 (30%)	62 (62%)
Female	23 (23%)	15 (15%)	38 (38%)
Total	55 (55%)	45 (45%)	100 (100%)

Table 2: Distribution of mean and range of vitamin D levels

Sex	Mean (ng/ml)	Range (ng/nl)
Male	31.49	15.3- 66.1
Female	30.41	14.2- 85.5
Total	31.08	14.2- 85.5

DISCUSSION:

There could be three possible reasons for the deficiency in the population. i) Poor intake of vitamin D containing food items was the primary cause and not decreased sunlight exposure. It therefore implies that there is need to get both sunlight as well as a balanced diet for adequacy of vitamin D. This is possible by consuming a vegetarian diet with a combination of "*Cereals + Pulses + Vegetables + fruits*" in the right proportions every day (no vegetarians could take egg, fish or meat instead of the pulses). Though there are no data to support, it is a common observation that very few people know what constitutes a balanced diet, and some beliefs and wrong concepts about diet prevent many from taking dietary items which contain Vitamin D. There are only very few who regularly get all these in their diet due to lack of awareness about what constitutes a balanced diet. Even if they are made aware of and motivated many have no access to balanced diet due to poverty.[7] ii) Reduced cutaneous biosynthesis of vitamin D could be another reason, due to the increased melanin in skin which could be interfering with ultraviolet light mediated vitamin D synthesis.[8] iii) To compound the problem further, it could be possible that the poor intake of vegetables, which is a very common issue in most people of our country, and the resultant magnesium deficiency might lead to reduced parathyroid hormone (PTH) secretion and the consequent reduction of 1- hydroxylation of vitamin D,[9] since PTH is needed for this step in Vitamin D biosynthesis.

CONCLUSION:

Thus, the present study was observed Vitamin D deficiency in healthy individuals. These results suggest a therapeutic need for vitamin D in the treatment of communicable and non-communicable diseases. No conflict of interest.

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